

CLAIMS

[1] An anisotropically conductive connector comprising an elastic anisotropically conductive film composed of a plurality of conductive parts for connection each extending in a thickness-wise direction of the film and arranged in a state separated from each other along a plane direction of the film and an insulating part formed among these conductive parts for connection, and a frame plate for supporting the elastic anisotropically conductive film, wherein

the frame plate is formed of a metallic material having a coefficient of linear thermal expansion of 3×10^{-6} to $2 \times 10^{-5} \text{ K}^{-1}$, the conductive parts for connection in the elastic anisotropically conductive film are obtained by filling conductive particles having a number average particle diameter of 20 to 80 μm and exhibiting magnetism in an elastic polymeric substance at a high density, the conductive particles have, on a surface of which, a coating layer composed of a noble metal and having a thickness of at least 20 nm, each of the conductive parts for connection has a durometer hardness of 10 to 35, and an electric resistance between conductive parts for connection adjoining each other is at least $10 \text{ M}\Omega$.

25 [2] The anisotropically conductive connector according to claim 1, wherein the frame plate has at least one through-hole extending in the thickness-wise direction,

and the elastic anisotropically conductive film is arranged in such a manner that the conductive parts for connection thereof are located within the through-hole in the frame plate.

5 [3] The anisotropically conductive connector according to claim 1, wherein the frame plate has a plurality of through-holes each extending in the thickness-wise direction, and the elastic anisotropically conductive film is arranged in such a manner that the conductive parts 10 for connection thereof are located within the respective through-holes in the frame plate.

[4] The anisotropically conductive connector according to any one of claims 1 to 3, wherein an allowable current value of each of the conductive parts for 15 connection when the conductive part for connection is pressurized in the thickness-wise direction under a load of 20 g is at least 1 A.

[5] The anisotropically conductive connector according to any one of claims 1 to 4, wherein an allowable 20 current value of each of the conductive parts for connection when the conductive part for connection is pressurized in the thickness-wise direction so as to give a distortion factor of 20% is at least 1 A.

[6] The anisotropically conductive connector 25 according to any one of claims 1 to 5, wherein an electric resistance of each of the conductive parts for connection in the thickness-wise direction as measured in a state that

the conductive part for connection has been pressurized in the thickness-wise direction under a load of 20 g is at most 0.1 Ω , and an electric resistance of the conductive part for connection in the thickness-wise direction as measured in a state that the conductive part for connection has been pressurized in the thickness-wise direction under a load of 20 g after a cycle that the conductive part for connection is pressurized for 15 minutes in the thickness-wise direction under a load of 20 g in an environment of 5 80°C in temperature, and the conductive part for connection is then held for 5 minutes in an unloaded state was repeated 3,000 times is at most 0.1 Ω .

10

15

[7] The anisotropically conductive connector according to any one of claims 1 to 6, wherein an electric resistance of each of the conductive parts for connection in the thickness-wise direction as measured in a state that the conductive part for connection has been pressurized in the thickness-wise direction so as to give a distortion factor of 20% is at most 0.1 Ω , and an electric resistance 20 of the conductive part for connection in the thickness-wise direction as measured after a current of 1 A is applied to the conductive part for connection for 3,000 hours in a state that the conductive part for connection had been pressurized in the thickness-wise direction in an 25 environment of 80°C in temperature so as to give a distortion factor of 20% is at most 0.1 Ω .

[8] A wafer inspection apparatus for performing

electrical inspection of a great number of integrated circuits formed on a wafer, which comprises:

a circuit board for inspection having a great number of inspection electrodes on a front surface thereof;

- 5 a probe card having a circuit board for connection, on the back surface of which a plurality of terminal electrodes have been formed in accordance with a pattern corresponding to a pattern of the inspection electrodes of the circuit board for inspection, and a contact member,
10 which is provided on the front surface of the circuit board for connection, and on which a great number of contacts brought into contact with respective electrodes to be inspected of the integrated circuits on the wafer, which is an object of inspection, have been arranged, and arranged
15 in such a manner that the terminal electrodes of the circuit board for connection are opposed to their corresponding inspection electrodes of the circuit board for inspection; and

the anisotropically conductive connector according to
20 any one of claims 1 to 7, which is arranged between the circuit board for inspection and the circuit board for connection in the probe card to respectively electrically connect the inspection electrodes to the terminal electrodes.

- 25 [9] The wafer inspection apparatus according to claim 8, wherein the three of the circuit board for inspection, the anisotropically conductive connector and

the circuit board for connection are fixed in a state that
the elastic anisotropically conductive film in the
anisotropically conductive connector has been held and
pressurized by the circuit board for inspection and the
5 circuit board for connection, thereby the inspection
electrodes in the circuit board for inspection and their
corresponding terminal electrodes in the circuit board for
connection are electrically connected through the
conductuve parts for connection in the anisotropically
10 conductive connector.

[10] The wafer inspection apparatus according to
claim 8, which comprises a pressurizing mechanism for
pressurizing the circuit board for inspection to
electrically connect the respective contacts of the contact
15 member in the probe card to the electrodes to be inspected
in the wafer, which is the object of inspection, wherein
the circuit board for inspection is pressurized by
the pressurizing mechanism, whereby the elastic
anisotropically conductive film in the anisotropically
20 conductive connector is held and pressurized by the circuit
board for inspection and the circuit board for connection,
thereby the inspection electrodes in the circuit board for
inspection and their corresponding terminal electrodes in
the circuit board for connection are electrically connected
25 through the conductive parts for connection in the
anisotropically conductive connector.